

ESTONIA - Cities and Rural Municipalities in Figures

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FOREWORD

In the foreword to the publication "Linnad ja vallad arvudes 2006. Cities and Rural Municipalities in Figures" it was stated "Perhaps we should, instead of other complex rankings, start measuring how content and happy people are." This thought emerged due to the article "Regional differences of happiness and satisfaction" by Dr. Mare Ainsaar which belonged to the scope of the referred publication. The idea was expressed but remained unrealised. Despite that, every year the compilers of "Linnad ja vallad arvudes. Cities and Rural Municipalities in Figures" have tried to describe and analyse the regional development of Estonia from different angles and the present publication follows the same direction.

The 2009 publication is special for new indices as it contains two articles where the regional development of Estonia has been analysed on the basis of new indices. The work done by Rivo Noorkõiv and his team during a number of years has been shaped into the article "Estonian local government capacity index: methods and results, 2005–2008". Kaja Sõstra observes the situation in Estonia on the basis of territorial development index of local government unit. The initial idea of this index was taken over from the Latvians who have analysed the regional development of Latvia by applying the same index (see the article "Regional policy and administrative territorial reform in Latvia" written by the Latvian analysts Ralfs Spāde, Valentīna Locāne, Janis Bruneniēks and Peteris Skinkis and published in the publication "Maakonnad arvudes. 2004–2008. Counties in Figures"). In terms of content, the article "Regional differences and changes in family benefits in Estonia, 2004–2008" by Mare Ainsaar and Kadri Soo is also based on indices, but here, we cannot say that we have to do with the introduction of new indices. Certainly, this does not diminish the value of this article. But, we can indeed state that the spatial analysis tools used by Ülle Valgma in the article treating regional differences in the dwelling construction of Estonia have never before been employed in Estonian statistics. The fifth article of the publication "Märjamaa rural municipality - good to be, desire to come" by Gaili Ilisson is innovative due to the subject discussed, because the condition and welfare of a rural municipality has never before been analysed in any of the issues of this publication. For years, the compilers of the publication in hand have tried to find authors from local governments who could analyse the development of the region where they live, but all earlier attempts to this end have been in vain. We are grateful to the people at Märjamaa who made up their minds, undertook the work and did it!

The above passages gave a short introduction to the articles presented in this publication. Next, we are again going to focus on the purpose of our articles. The comments by the media that usually follow after some author has ranked local government units, and not only local government units, by some kind of features, have given rise to that. The referred comments can be divided into four groups. As a rule, the leaders of the local governments that hold the best positions in the rankings praise themselves by saying 'yes, we are doing well'. The leaders of the local governments placed in the final positions of the rankings are of the opinion that they have been treated a bit unjustly, because, in fact, they are more successful than reflected and a lot of things are in a better condition by them than elsewhere. The third group of commentators are the ones who do not grasp the treated topic, but because of their inherent nature they are inclined to speak ill. The fourth group is comprised of those who hardly produce any public comments on the published material, but at the same time conduct profound analysis thereof from their own perspective in order to spot the places positioned ahead of neighbours and the places lagging behind others.

Proceeding from this information, one can plan activities for developing the strengths and for overcoming difficulties. In particular, the compilers wish to hand the publication in to the persons belonging to the fourth group. Let us hope that the share of the described fourth group is continually increasing.

Rankings can be compiled by relying on entirely different methodologies and thus the results can vary to a large extent. The aim of rankings published in the publications of Statistics Estonia is not to distribute the positions of the bad and the good on the scale. On the contrary, the aim of Statistics Estonia is to state, on the basis of objective information, which is the actual state of affairs regarding definite indicators calculated by the described methodology. An index may have an attractive title, but in order to understand its content, one should read the relevant definition and not generate misunderstandings grounded on a high-sounding name and the emotions it evokes about the information that the index involves.

There have been attempts to list local government units on the basis of different features. Earlier undertakings of this kind have been reviewed by Rivo Noorkõiv and his co-authors in their article. This list can be supplemented with several materials compiled mostly by journalists and published in the press. All of them observe the regional development of Estonia from a different aspect and make the total picture more diversified.

Relevant examples include:

- Rein Sikk “Elamisväärsimate linnade tippu kroonib ülikoolilinn Tartu” (the Eesti Päevaleht, 21 April 2008) - an article about the university city Tartu as the most liveable city.
- Gert D. Hankevitz, Raivo Sormunen “Linnad on kaotanud miljoneid. Suurim tulumaksu laekumiste tõus suurte linnade lähivaldades ja Peipsi ääres” (the Äripäev, 16 July 2008) - an article reporting that cities have lost millions and that the largest increase of income tax revenue was detected in the rural municipalities located near large cities and near Lake Peipus.
- Lauri Linnamäe, Raigo Pajula “Depressiivsemas väikelinnas ümbritseb trööstitu miljöö rõõmsaid inimesi” (the Postimees Extra, 19 July 2008) - an article about the cheerless milieu surrounding happy people in depressive towns.
- Vahur Koorits, Hille Tänavsuu “Kalleim on valitsemine Kallastel ja odavam Kohtla-Järvel” (the Postimees, 1 September 2008) - an article reporting that administration costs are the largest at Kallaste and the smallest in Kohtla-Järve.
- Risto Berendson “Peksupealinnad on Pärnu ja Valga” (the Postimees, 10 November 2008) - an article describing Pärnu and Valga as notorious ‘beating capitals’.
- Kaire Uusen “Noarootsi rahvas tegi palgaga tallinlastele ära” (the Postimees, 5 December 2008) - an article pointing out that the people at Noarootsi have bigger wages than the inhabitants of Tallinn.
- Raimo Poom “Puudega Eesti: statistika järgi käib iga kümnes elanik karguga” (the Eesti Päevaleht, 15 January 2009) - an article focusing on disabilities in Estonia: according to statistics every tenth inhabitant is on crutches.

A question arises whether some indicator or ranking is better than other. To be objective - no, it is not. At the same time, every person has got values that he/she considers important. The more importance a person attributes to a value, the more essential the relevant ranking and position of his/her native place therein probably is for him/her.

New ranking lists will definitely be compiled and new indicators on the basis of which to compare the local government units will be sought in future, too. Statistics Estonia is going to contribute to this process with a view to gaining more in-depth knowledge about the regional development of Estonia. It is difficult to predict whether it will be possible to rank local government units by the inhabitants' feelings of content and happiness next year. No doubt that the 21st century is in need of indicators different from the economic growth indicators considered popular so far. Why cannot the feelings of content and happiness serve as such? France is going to follow this path according to the news reported in the 17 September 2009 issue of the daily Postimees: the French president Nicolas Sarkozy stated in his speech that France plans to include happiness and well-being in the country's measurements of economic progress. For measuring this, France is going to adopt a statistical methodology worked out by two Nobel economists.

I would like to thank all persons who have contributed to the publication of this issue and our readers. Hopefully, the discourses and thoughts expressed in the presented articles will give rise to new constructive ideas.

In 2010, a new publication titled “Eesti piirkondlik areng. Regional development of Estonia” will be launched. It is going to replace two publications “Maakonnad arvudes. Counties in Figures” and “Linnad ja vallad arvudes. Cities and Rural Municipalities in Figures”. The compilers will be grateful for any opinions on how to make this publication useful and interesting for you.

Mihkel Servinski, Principal Analyst

1. ESTONIAN LOCAL GOVERNMENT CAPACITY INDEX: METHODS AND RESULTS, 2005–2008

Veiko Sepp, Rivo Noorkõiv, Kaja Loodla, Geomedia Consulting and Training Centre

Introduction. The task of and solutions to measuring local governance in Estonia

Local-level governance is a complex phenomenon that embraces many aspects of life and includes elements from politics, administration and service provision (see, e.g., Haljaste et al. 2007). The development of the concept of good governance in societies has led to an increased desire and need to assess the performance of local governance and to identify key factors behind success. An assessment that meets the requirements for good governance should be based on knowledge derived from comparable data. Good governance is also knowledge-based governance (see Sepp and Noorkõiv 2008a).

Options for measuring local governance

There is a wide range of available options concerning the criteria and methods of assessing local governance. However, they all require measurements based on a certain method. For instance, the objects of measuring could include the practices of local governance, the results or conditions of governance. It is possible to measure the quality, scope (e.g., the range of performance) or economic efficiency of governance. Measuring could focus on the current situation and/or the potential contained therein, or on the past development. The task of measuring could be restricted to a specific field or to an even narrower focus, or it could target local governance in general. The purpose of measuring is the key factor in choosing a suitable method for measurement.

There have been several attempts in Estonia, in the last decade, to develop complex measuring systems for local governance. These systems can have differing starting points and objectives, but they can be divided in two broad categories based on the type of measured values. The first category includes measuring systems where the result is expressed as a summarised aggregate value, an index. These systems have the benefit of enabling general internal comparisons within the Estonian local government system. The indexes of this type include the viability index (Sõstra 2004; Lehto 2005) and the local government units development index (Kivilaid 2005), both compiled by Statistics Estonia, the development and financial ratings of Enterprise Estonia, the measurement of socioeconomic potential, proposed by Lembit Suvi (1999), and the local government administrative capacity index of Geomedia (Sepp 2008; Sepp and Noorkõiv 2008b).

As an alternative, complex measuring systems, where an aggregate index is not calculated, have been described in Estonia as well. Interesting examples of this type include the rating system for cities and rural municipalities by Hillar Kala (2001), the calculations of development potential, welfare and functionality by Arno Lõo (2004), the local government capacity measurements in Läänemaa and Hiiumaa, conducted in cooperation by the Läänemaa Development Centre Foundation and the Tallinn University (Sootla and Suur 2006), the analysis of factors affecting administrative capacity in Järvamaa, by Geomedia (Sepp 2008). Such measurements generally provide readily interpretable knowledge about (parts of) the local government system, but require an excellent ability to synthesize in order to make any comparative generalisations.

General index of local government capacity

This article presents a proposal for calculating a general index of local government capacity (LG capacity), prepared at the order of the Ministry of the Interior (Sepp, Noorkõiv and Loodla 2009). Consequently, in the above classification, it belongs to the first category of measuring systems and its primary purpose is to enable comparisons. The article first describes the theoretical foundations for the selection of the content and indicators for the index. It also provides definitions of the indicators used. This is followed by an explanation of the index calculation principles. Measurement results on Estonian rural municipalities and cities have been presented as a ranking (Table 1.5 at the end of the article) and as maps (Maps 2–8 in the Annex 1). The analysis of the results focuses on the systemic variability in the capacity of local government units by functional groups in urban regions and by size groups. The final part of the article includes a brief comparison of the general index of LG capacity with other Estonian local government measuring systems, as well as an assessment of the strengths and weaknesses and future development potential of this index.

Nature and capacity of local government units

In order to develop a capacity index for local government units, we should first define the nature of local government units and explain the meaning of the concept of capacity.

Nature of LG units

According to the broadest definition, a local government unit is a corporate entity that represents the residents (registered) in a certain territory, as well as the organizations created by such residents, and is responsible for joint management of local life (see Haljaste et al. 2007). This definition enables to highlight two principal dimensions of LG units. Firstly, LG units are territorial units, which, in the case of Estonia, mean rural municipalities and cities. This is related to capacity arising from the particular territory and from the members of the corporate entity - the residents and any organisations, associations and networks they have created.

Secondly, LG units are management and administration structures where capacity is most significantly expressed as autonomous representative democracy, the ability to manage local life and to provide public services.

The LG capacity index assigns equal weights to both dimensions of the LG units. Both dimensions have three components of LG capacity used for the calculation of the index, making it six components in total. In measuring the capacity of a LG unit as a territorial entity, the components include population and land (A1), arising directly from the definition, local economy (A2) and population welfare (A3) as the most characteristic aspects of the capacity of rural municipalities and cities. The capacity of local administration is described through organisational structure for management, administration and service provision (B1), financial capacity of local government (B2) and capacity for service provision (B3).

For the purposes of the LG capacity index, capacity means a measure of the subject's ability, or potential, to achieve certain goals. Capacity can be expressed as absolute quantitative capacity. It is obvious that 400,000 people are, in most cases, able to achieve more and to perform better than 900 people. Capacity can arise from diversity within an entity or a system. It can be assumed that a business sector with a diversity of trades is able to provide more jobs, is more stable and can generate more income for local budgets.

Capacity can also be related to structural properties of the subject, such as the ethnic structure of a territorial unit. In addition, capacity can be assessed as a relative measure, divided by the number of individual constituents of a system or entity.

All the aforementioned measures of capacity are used below for the description of the components. With regard to the indicators of the index, a selection is made between different types of capacities on the basis of the basic nature of the respective component. For instance, population welfare is rather naturally observed through local residents and, consequently, only relative capacity indicators are used to describe this component. However, when characterising local economies, relative capacity indicators are supplemented by an indicator of diversity of business sectors.

The following paragraphs present a list of the indicators used to establish the LG capacity index, including definitions of the indicators on the basis of the data used, references to data sources, and the type of capacity characterised by each indicator.

A1. Population and land

The component comprises two indicators of absolute capacity and two indicators of structural capacity. In terms of importance, more weight is assigned to population, which is described by three of the four indicators.

1. The number of registered residents is recorded as at the start of the year, so that the population status of 2007, for instance, is described by the status on 1 January 2008. The number of residents describes absolute capacity of the unit.
2. The dependency ratio describes the proportion of residents younger than 14 years and older than 65 years in comparison to the number of residents in the age group 15–64. The indicator describes current structural capacity of the population, assuming that residents of working age (15–64 years) constitute a more 'dynamic' part of the population, irrespective of the actual social, economic, etc., capacity of these residents. The calculation of ranking points (see the next section of the article) is based on the reversed order of the values of this indicator.
3. The population reproduction potential is expressed by dividing the number of women in the age group 15–49 by the total number of residents. This structural indicator is designed, at a

fairly abstract level, to measure the future of the population status by describing a factor that affects the number of births.

4. The land value is described through summarised taxable value of the land, which is subject to land tax. This indicator of absolute capacity, arising from territorial properties of the LG unit, enables to take into account both the area of the territory and the value assigned to this land by society at the observed moment in time. The data source for population indicators is the Population Register and the land value is assessed on the basis of data from the Tax and Customs Board.

A2 Local economy

The local economy is simultaneously a measure of capacity of rural municipalities and cities and a precondition for the execution of local governance. The status of the local economy is measured through indicators that characterise economic units and jobs created, and greater weight is assigned to indicators of relative capacity.

1. The number of economic units per resident of working age is an indicator of relative capacity and it is calculated on the basis of the number of economic units in the statistical profile of Statistics Estonia, divided by the number of residents in the age group 15–64 as recorded in the Population Register. The statistical profile is compiled on the basis of data from the Business Register for Statistical Purposes.

The Business Register for Statistical Purposes has been created on the basis of data from legal registers - the Commercial register, the Non-Profit Institutions and Foundations Register, the Register of Taxable Persons, and the State Register of State and Local Government Agencies. The definition of economic units includes sole proprietors, companies, government institutions, local government institutions, non-profit associations, and foundations. The economic units in administrative units are determined on the basis of contact addresses.

2. The economic diversity indicates the number of business sectors represented among registered private entities (companies, non-profit associations, foundations) as defined in the Classification of Economic Activities on the basis of a 3-level classification¹. The Commercial Register is used as the data source.

3. The degree of job creation as an indicator of relative capacity characterises the number of jobs created per resident in the age group 15–64. The number of jobs is derived from the data of the Tax and Customs Board. This is done by adding up the persons for whom an employer, registered in the LG unit in question, pays social tax and the sole proprietors, registered in that LG unit, who are subject to the payment of social tax.

4. The average job value is also an indicator of relative capacity and it is calculated by dividing the amount of social tax, declared by employers registered in the LG unit in question, by the number of persons for whom social tax has been paid according to the declarations of employers. The data source for the amount of social tax is the Tax and Customs Board.

A3. Population welfare

Population welfare is measured only on the basis of relative indicators, because this component is, by definition, associated with individuals. The object of assessment is the capacity of individuals as key members of territorial units. In the context of the dimension of self-governance, this pertains to indirect indicators, which, on the one hand, indicate the long-term impact of governance and, on the other hand, create preconditions (e.g., through the income of residents) for local governance. The objects of measurement include the income of population, employment, and coping problems.

1. The level of population income is calculated by adding up the taxable income of individuals (the amount of personal income tax received by the local government units, multiplied by the quotient of the income tax allocated to local government units) and pensions (old-age pension, pension for full length of service required, pension for incapacity for work, other pensions) and dividing the result by the number of residents. The data on income tax are received from the database of the Tax and Customs Board and the data on pensions from the Social Insurance Board.

2. The level of employment is found by dividing the number of employed persons registered in the LG unit (for whom an employer declares social tax) plus the number of registered sole pro-

¹ The Estonian Classification of Economic Activities (EMTAK) was amended in 2008. The former 3rd level of EMTAK 2003 included 224 groups, while the 3rd level of EMTAK 2008 includes 272 groups. Additional conversions have not been made for the calculation of average values for the period 2005–2008, because potential variance between the values of the new and old classifications does not exceed 20%.

prietors (who are subject to social tax payments) by the number of residents in the age group 15–64. The data on social tax are derived from the databases of the Tax and Customs board.

3. The level of unemployment is calculated by dividing the average number of registered unemployed persons over the 12 months of last year by the number of residents in the age group 15–64 (as at the end of the year). Calculation of ranking points is based on the reversed order of the values of the indicator. The data are derived from the information submitted to Statistics Estonia by the Labour Market Board.

4. The extent of coping problems is characterised by dividing the total amount of national subsistence benefit, allocated to the residents of the LG unit, by the number of residents in the rural municipality or city in question. Calculation of ranking points is based on the reversed order of the values of the indicator. The data on the amounts of the subsistence benefit are received from the Ministry of Social Affairs.

B1. Local government organisation

This component is measured through the relative strength of the mandate received through democratic elections and the absolute capacity of the administrative and executive structures of the local government.

1. The strength of democratic mandate is measured by using the percentage of people who voted in the local council election of the total number of people entered in the polling lists. As election takes place in every four years, the results of the most recent election are considered in the case of the intermediate years. For the period 2005–2008, the annual results are calculated on the basis of the results of the local government council election of 2005. The data source is the database of the National Electoral Committee.

2. The number of officials determines the absolute capacity of local government agencies for performance of various administrative functions and creates preconditions for hierarchical and professional specialisation. The number of officials is described through the official number of jobs in administrative agencies (city and rural municipality governments, subordinate administrative agencies, offices of the local council with the status of administrative agencies) as specified in the state register of state and local government agencies as at 1 January of the following year.

3. The institutionalisation of local government is an indicator that describes the capacity for management of local life and for service provision at the most general quantitative level. The values of indicator are calculated by adding up the number of institutions managed by local administrative institutions and the number of private companies wherein the municipality holds an interest (incl. joint companies²). The number of institutions in a year is specified as at 1 January of the following year. The data on the number of institutions and entities are derived from the Register of State and Local Government Agencies and the from the balance records information system, respectively.

B2. Financial status of local government

The component is described through relative and structural indicators.

1. The relative resources of the local budget for meeting the needs and requirements of the population are characterised through the volume of a net revenue (the budget minus allocations for a specific purpose) in Estonian kroons, divided by the number of residents of the rural municipality or city in question.

2. The debt burden indicates the limitation on potential future expenditures of the LG unit. The debt burden is a structural indicator, which is calculated as a net debt burden of the consolidation group of the LG unit, where liquid assets have been deducted from the debt liability of the consolidation group, and the result is divided by the income from the principal activity of the consolidation group. Calculation of ranking points is based on the reversed order of the values of the indicator.

3. The value of fixed assets of a city or rural municipality characterises the relative capacity of a city or rural municipality government for the provision of services on the basis of its assets, or the potential to exchange the assets for financial resources. The values of the indicator are calculated by dividing the value of the fixed assets of the local government by the number of residents.

4. The level of local government investment describes relative renewal of assets. Retrospectively, the level of investment describes the spending power and, prospectively, it describes the created capacity for the provision of high-quality services. The indicator is calculated by dividing the amount of investments from the local budget by the number of residents.

² Joint companies do not include companies established by local government associations.

5. The capacity for self-financing is a general financial policy measure that characterises health of the budget. The indicator is defined as the accrual coefficient of capacity for self-financing. It is calculated by dividing a net revenue (the budget minus allocations for a specific purpose) of the local government, including allocations received for local road management and excluding revenue from the sale of assets, by the expenses incurred, excluding any paid interest, investments, running costs paid from allocations for a specific purpose, and specific-purpose allocations of local government for acquisition of fixed assets.

All indicators of the financial status of local governments are taken from the table of the Ministry of Finance, used for the analysis of financial indicators of local governments.

The capability of service provision is measured in four key areas: education, social protection and health, recreation, and management and environmental protection. Each field is measured through one indicator of diversity, or absolute capacity, and one indicator of relative capacity. Diversity and absolute capacity are described by recording the existence of institutions providing a certain type of service, or the existence of basic services. Relative capacity is characterised through the ability of the rural municipality or city government to make expenditures from the local budget for the provision of services per member of the target group. The selection of indicators is based on the understanding that, generally, the need for financial resources in the Estonian LG system exceeds the level of available resources and, consequently, the main factor that determines the level of expenditure is the ability of the LG unit to make expenditures from own funds or from support received. In part and retrospectively, these indicators also describe the ability of the rural municipality and city governments to draw additional funds for the development of local life from the state and other donors.

1. The diversity of education services is found on the basis of the existence of municipal institutions that provide basic educational services (kindergarten, primary school, basic school, gymnasium) in that LG unit. One point is allocated for the existence of each of the listed basic services, with the maximum being four points and minimum being zero points (when the LG unit has not institutions that provide the listed services).

2. The values of the diversity of recreational services are calculated by describing the existence of municipal institutions that provide basic recreational services (music or art schools, sports schools, cultural institutions³, a museums, youth institutions⁴, b libraries, sports centres⁵) in the LG unit. One point is allocated for the existence of each listed type of institutions (incl. joint entities), with the maximum being seven points and minimum being zero points.

3. The diversity of social and health services is determined by describing the existence of basic social services on the one hand and the existence of typical municipal institutions on the other hand. Basic social services include the provision of social dwelling and short-term accommodation services and the use of home care and care for the disabled. The typical institutions considered are care homes, social centres, institutions for the protection of children and families⁶, and healthcare institutions⁷. One point is allocated for the existence of each listed basic service and the type of institutions (incl. joint entities), with the maximum being eight points and minimum being zero points.

4. The capability of service provision in management and environmental protection is characterised through an indicator that largely also describes the diversity of services and the level of specialisation of institutions. The value of the indicator is calculated by adding up the number of municipal institutions and private entities in the field of management and environmental protection⁸. One point is allocated for the existence of each respective institution or entity (incl. joint entities).

³ Culture, village and community centres, clubs with the status of an institution, recreation centres (also included as sports centres), hobby centres (also included as youth institutions).

⁴ Open youth centres, youth hobby centres, local hobby centres (also included as cultural institutions), hobby schools (except music and art schools and sports schools).

⁵ Sports centres, venues, buildings, stadiums, swimming pools, etc., with the status of an institution, health centres with sporting facilities, recreation centres (also included as cultural institutions).

⁶ Children's homes, shelters, family support centres.

⁷ Hospitals, polyclinics, dental care institutions, health centres that provide medical services, pharmacies, emergency medical care.

⁸ Housing and utilities management, waste management, environmental protection, property management, commerce and production institutions and entities.

5. The relative extent of educational expenditures is calculated by dividing the education expenditures of the local budget (classification of budget activities, 09) by the number of registered residents in the age group 0–19 in the same year.
6. The relative extent of social protection expenditures is calculated by dividing the social protection expenditures (excluding the amount of national subsistence benefit) of the local budget (classification of budget activities, 10) by the number of registered residents in the same year.
7. The relative extent of recreational services expenditures is calculated by dividing the recreational services expenditures of the local budget (classification of budget activities, 08) by the number of registered residents in the same year.
8. The relative extent of management and environmental protection expenditures is calculated by dividing the management and environmental protection expenditures of the local budget (classification of budget activities, 04–06) by the number of registered residents in the same year.

The State Register of State and Local Government Agencies and the balance records information system are used as data sources on the diversity of service provision and absolute capacity, while the Social Register and the database of the Ministry of Social Affairs are additionally used in the case of social services. The relative extent of expenditures in each field is derived from the local budget implementation reports of the Ministry of Finance.

Calculating the LG capacity index

Calculation of the LG capacity index starts from individual indicators. Like in the calculation of the viability index (see Sõstra 2004; Lehto 2005), a ranking of the local government units is compiled on the basis of the values of each indicator and the LG units are then allocated scores according to their position in the ranking. The highest-ranked unit scores 100 points for the respective indicator and the lowest scores 0.44 points. Generally, the exact value of points depends on the current number of local government units. In the case of 227 LG units, the exact points value of the last unit is calculated as follows: $1 \text{ (for the last place)} \times 100 / 227 \text{ (total number of units)} = 0.4405\dots$ Should the number of local government units decrease in Estonia, the points values allocated to the units for different indicators will change accordingly. In the case of 100 local government units, the value of the last place would be exactly 1 point and all intermediate positions in the ranking would score a whole number of points. If the calculated value of an indicator is exactly the same for several LG units and they share the same ranking position (e.g., 6–12), all these units will score the points corresponding to the highest ranking position (6).

Ranking points of the indicators are calculated on the basis of the average value of the indicators over the period of four years, 2005–2008. In this way, the results are less sensitive to annual fluctuations caused by certain non-recurrent events. The four-year span could be an optimal measuring period for the LG capacity index so that, in calculating the index in the subsequent year, the earliest years are discarded as new years are added. For the purposes of this analysis, values have been additionally calculated separately for each year of the period. In addition, parallel values of each indicator are used to assess short term changes, dividing the values of 2008 by the average values of the period 2005–2008.

By averaging the ranking points of individual indicators, we get the index values of the six components of the local government capacity, and by averaging those six values, we get the general index of LG capacity. In addition to balanced consideration of the nature of the LG units, as described in the second section, this structure of the index creates an opportunity for additional analyses by individual indicators and components of the LG capacity.

Local government capacity in Estonian cities and rural municipalities

Values of the LG capacity index of LG units

The values of the LG capacity index of the units of the Estonian local government system, calculated for the period 2005–2008, range from 83.6 points to 13.3 points. The highest capacity index was calculated for Viimsi rural municipality, followed by Saku rural municipality and the city of Tallinn. In addition to the capital and its neighbouring local government units, the top ten of LG capacity also includes the city of Tartu, Rapla rural municipality and the city of Pärnu.

The lowest index value was recorded for Öru rural municipality, which scored nine points less than the penultimate local government unit, Peipsiääre rural municipality. A regional overview indicates a polarisation in the LG capacity in the direction from north–west to south–east, which is particularly noticeable in the case of rural municipalities. The majority of the local government units with lowest values of the capacity index are located in southeastern

and eastern parts of Estonia (see Map 2 in the Annex 1).

The values of the index are relatively stable over the years. The positions of the first-placed Viimsi rural municipality in individual years from 2005 to 2008 were 3rd, 1st, 2nd and 2nd, respectively; the highest value of the LG capacity index in 2008 was recorded for Rae rural municipality, which is ranked 4th in the summarised table. In the other end of the table, Öru rural municipality has been in the last position in all years considered. In the case of larger cities in Estonia, variations in the ranking between years do not exceed 10 positions (see Figure 1.1). Similarly, the position of other local government units in the observed period did not generally fluctuate more than by 20 places.

Lack of short-term changes in the capacity of local governments is also confirmed by the minimal variability of standard deviation calculated for the values of the general index of four years. It has consistently decreased from 12.75 in 2005 to 12.62 in 2008. Consequently, it can be stated that disparities in LG capacity have not increased in recent years in the Estonian local government system.

Current capacity level of LG units in comparison with the average level of 2005–2008

The results are significantly different when the capacity level of LG units in 2008 is compared with the average level of the entire period. The top five of the index of change in 2008 includes local government units, which are all ranked lower than 100th place in the general index (see Table 1.3). At the same time, the five LG units with the least level of change include LG units from the group of leaders (Tallinn, Rapla rural municipality) as well as from the last twenty (Kallaste city, Piirisaare rural municipality) in the overall ranking. Even at the meta-system level, the values of the index that compares the level of 2008 with the entire period do not correlate with the values of the general index of LG capacity.

LG capacity in terms of individual components

Looking at individual components of LG capacity, the results are fairly variable between LG units (see Maps 3–8 in the Annex 1). The top ten of the population and land component (A1) includes the cities of Narva and Kuressaare in addition to the capital and the surrounding regions. The city of Maardu is in the first place. The ranking of local economy (A2) is topped by Tallinn. In addition to rural municipalities around the capital, the top ten also includes five county centres - Tartu, Pärnu, Jõhvi, Kuressaare, and Kärdla. The top ten of population welfare (A3) only includes the local government units of Harjumaa. The municipality of Väandra town received the highest index value from the remaining counties. The capacity associated with local government organisation (B1) was highest in the case of Viimsi rural municipality. The top ten also includes eight cities from different regions of Estonia, as well as Vinni rural municipality. The ranking of local governments according to financial status (B2) is dominated by rural municipalities of the oil shale region, where local government budgets receive a significant boost from the fees for mining rights at deposits and for the special use of water. The first place is held by Mäetaguse rural municipality. Põlva is the highest city, in the 14th place. The top ten local governments according to capability of service provision (B3) include nine county centres and Järvakandi rural municipality (8th place). The best score was achieved by the city of Paide.

Disparities in capacity in the Estonian local government system are larger in the case of components that describe LG units as territorial units (A). The disparities are largest with regard to population welfare (A3), with 24.1 as the standard deviation of the values of the component index. However, welfare indicators have a tendency towards segmentation at the social level as well - both in relation to individuals and local government units. The smallest disparities were observed in the capability of service provision (B3). The value of the respective standard deviation was 14.4. On the one hand, this can be explained by the nature of the selected indicators, where one half comprises indicators of diversity and the other half indicators of relative capacity. On the other hand, providing the services and incurring respective expenses in the local budgets is a matter of choices, so that, for instance, large expenditures in one field restrict the ability to provide services in other fields.

The variance of values of the general index of LG capacity is smaller than the variance of any individual capacity component. Consequently, the discrepancies between capacities with regard to different components tend to be mutually compensative, painting a more even general picture of the differences in capacity within the Estonian local government system.

Another indication of systemic disparity in capacities is the selectiveness of correlations between the values of component indexes. There is a relatively good correlation ($R^2=0.28-0.5$) between the components associated with the capacity in terms of territory (A1–A3), as well as between the LG organisation (B1) and LG services (B3) ($R^2=0.37$). The financial status of local governments (B2) has no correlative associations with other components ($R^2<0.13$) and there was no significant correlation between population welfare (A3) and any of the components of local governance (B1–B3) ($R^2=<0.06$).

LG capacity differences in urban regions and in different size groups of local government units

LG capacity in urban regions and outside urban regions

Finnish geographer and Professor at the University of Turku, Jussi Sakari Jauhianen (2002) has identified 12 urban centres in Estonia — Tallinn, Kuressaare, Paide, Pärnu, Rakvere, Kohtla-Järve, Narva, Tartu, Viljandi, Valga, Haapsalu and Võru — and has delimited the local government units of the respective urban regions on the basis of the intensity of commuting migration. In addition to urban centres, urban regions also include local government units where at least 25% of the employees go to work in the urban centre.

Based on this classification, we can see very sharp differences in the capacity of LG units, depending on their position in those regional systems. The value of the general index of LG capacity in urban centres is over ten points higher than the average index value of the LG units in the hinterland of the urban regions. The latter index value, in turn, is eight points higher than the average index value of the local government units outside the urban regions.

Similar hierarchy can be observed in the case of two components associated with the territorial aspects of LG capacity — population and land (A1) and local economy (A2). The disparities between different categories of local government units are even larger in this case. The results indicate that population welfare and the associated capacity (A3) are distributed within urban regions. The respective average level of capacity in LG units outside urban regions is lower by 15 points.

The distribution between urban centres, other units in urban regions and units outside urban regions is slightly different in the case of LG capacity components associated with self-governance.

Urban centres are markedly different from the other categories with regard to two components - LG organisation (B1) and LG services (B3). As the LG units in the hinterland of urban centres can compensate for the lack of local services through the services provided in urban centres, which is a widespread practice, the capability of service provision plays a more crucial role for the local government units outside the urban regions.

The results obtained with this methodology did not indicate any significant differences in financial status inside and outside urban regions.

LG capacity in size groups of local government units

The size of LG units, based on the number of residents, has been a recurrent topic in the context of the Estonian administrative reform. The average value of the LG capacity index increases steadily from smaller to larger units until the level of 4,000 residents. The next thousand residents in a LG unit do not improve capacity; instead, the average index value even decreases. A significant increase in LG capacity can be observed in the next size group, which includes local governments with more than 5,000 and less than 10,000 residents. When the number of residents exceeds 10,000, 15,000 or 20,000 it no longer significantly increases LG capacity in Estonia's current local government system.

Four of the six capacity components follow the general trend. One exception is population welfare (A3) where only the two smallest size groups, i.e., rural municipalities and cities with less than 2,000 residents, achieved worse results than the other size groups. The financial status (B2) of local governments is systemically not dependent on the size of LG units.

As there are 45 local government units with over 5,000 residents (20%) and 118 units, i.e., more than half, have less than 2,000 residents, it could be stated that the Estonian local government system is dominated by LG units with relatively lower capacity.

Summary, discussion and conclusions

Summary

The development of the LG capacity index, presented in this article, was based on a broad concept of LG unit. The purpose of the index is to provide a balanced description of the capacity of Estonia LG units, which would take into account their nature as territorial units (rural municipalities and cities) and as corporate entities that perform the tasks of self-governance.

The two dimensions of LG units are essentially interrelated. The capacity associated with population, local economy and population welfare creates preconditions for local self-governance, while the developed capacity for self-governance facilitates contribution to the capacity of the local population, economy and the social capacity of the residents, as well as creation of conditions for better governance. It can be assumed that the territorial capacity of LG units is more stable over time than governance capacity. However, poor governance can quickly exert an adverse influence on local economy and population welfare, causing emigration of population and devaluation of land.

The values assigned to Estonian LG units for 2005–2008, using the methodology of LG capacity index calculation, create a picture, which is relatively consistent with the general perception of Estonia's regional development. The capacity is clearly higher in the region in and around the capital, and there is a general decrease in capacity towards south-east. In addition, urban regions, urban centres and local government units with a higher number of residents are also positively differentiated. This latter observation is partially caused by theoretical assumptions in the methodology, which attaches value to the absolute capacity and the capacity arising from diversity in LG units. Regional and typological patterns differ in the case of individual components and indicators, providing additional opportunities for comparison and analysis.

As the calculation of the index is based on national registers and statistics, the reliability of results is dependent on the quality of data in national statistics and registers. The quality of respective national data was indeed one criterion for the selection of indicators. Reliability of data obtained by using this method is confirmed by the fact that the calculations produce stable results for different years. Partially, the stability of the results can be explained by a methodological choice – indicators that describe short-term changes were excluded from the general index of LG capacity. However, the method enables to compare LG units on the basis of short-term changes as well. Respective calculations for 2008 – the values of 2008 were compared, by individual constituent indicators of the index, with the average level of the values in the period 2005–2008 – indicate that short-term changes are not in correlation with the general level of capacity. A comparison of mid-term changes could produce more informative results. For instance, it would be possible, in 2012, to compare the average levels in periods 2005–2008 and 2009–2012 to assess any possible developments.

Comparison of the LG capacity index with other LG measuring systems

A comparison of the method of LG capacity index with other systems developed in Estonia in recent years enables to draw the following conclusions about the selection of indicators and the underlying theoretical foundations. The broader concept of LG units, which is used as a basis for the development of the LG capacity index, is fairly common in those measuring systems that do not aim to produce a general index. For instance, the rating system for cities and rural municipalities by Hillar Kala (2001) and the local government capacity measurements in Läänemaa and Hiiumaa (Sootla and Suur 2006) both include indicators from all six components of LG capacity. However, the indices, which have been developed before, have been usually restricted to indicators that describe the territorial aspect of LG units (see Suvi 1999; Lõo 2004; Kivilaid 2005), which is in some instances supplemented by an indicator of financial status (the development rating of Enterprise Estonia and the viability index – Sstra 2004; Lehto 2005). Such indexes have previously not integrated other important indicators of local government as an administrative organisation and the provider of local public services. In contrast, the administrative capacity index, compiled in 2008 by Geomedia (Sepp 2008; Sepp and Noorkõiv 2008b) focuses only on the aspect of governance and local services and treats the territorial properties only as hypothetical influence factors.

Therefore, the LG capacity index, presented in this article, can be seen as a step towards better application of a broader and balanced concept of the nature of LG units for the purpose of comparative descriptions within the Estonian local government system. At the same time, development of the index has revealed several problems to be resolved and venues of further development of the index.

Comparing this index with the administrative capacity index by Geomedia or the local governments capacity measurements by TLU, the LG capacity index offers very superficial means

to describe the resources and methods used for local governance and service provision in Estonian LG units. Even though measurement results indicate with sufficient clarity that the relative capacities of Estonia LG units for the administration of local life can vary to a great extent and that there is an obvious need to harmonise the capacities of local governments, the index values do not enable drawing unambiguous conclusions about the current or future level of success in the performance of administrative tasks in any specific LG unit. Instead, the results provide an opportunity to learn, which LG units have relatively larger or smaller general capacity for managing the tasks of local administration, irrespective of the particular administrative system and the tasks of the local government specified therein. It is obvious that virtually all local government units would be able to perform well if there were very few mandatory functions assigned to LG units by the state. Conversely, if the number of functions were to be very high and were to require large resources, no local government would be able to perform adequately, irrespective of its relative capacity. The Estonian administrative system is somewhere between those two theoretical extremes. All local governments are able to perform certain functions – and usually do so – but very few local governments, if any, are able to perform all functions at the best European level. For this reason, the terms 'administrative capability' and 'administrative capacity' have been avoided when referring to the index. Definition of criteria of administrative capability would require, firstly, a significantly more comprehensive and detailed description of administrative expressions (e.g., services, regulations) in the Estonian local government system and, secondly, an analysis of the influence factors of administrative capability, based in these descriptions.

Conclusions

The venues of further methodological development depend on the established goal. The main task in terms of a comparative index of Estonian LG units is to achieve a balanced description of capacity components based on the definition of local government. In practice, this means that certain choices have to be made when adding indicators to the index. A number of indicators were considered for this index, but were rejected due to lack of high quality data. A descriptive indicator of dwelling should be added to the population welfare component after the data in the Register of Construction Works becomes more reliable.

Additionally, this component could include an indicator of the physical and social environment. The component of local economy could be eventually expanded into a socioeconomic component. This requires supplementing the component with one or several noneconomic indicators, which describe the level of social organisation (e.g., an indicator of the development of civic society). In the case of the component of LG services, the quality of the index could be improved by including the services that have been contractually delegated to the private sector. Unfortunately, such information about Estonian LG units is currently not available in a methodologically uniform format. Addition of the absolute budget volume to the component should be considered to achieve a more comprehensive description of the financial status of local governments, because it has a real influence on the range of options in local governance. The availability of data is not a problem in this case.

If the task is assessment of the administrative capacity of Estonian LG units and identification of the determinant factors of administrative capacity in order to use this knowledge for considered policy decisions – either at the territorial level (merger of units) or the level of local governance (division of tasks) – the first methodological objective would be to establish minimum criteria of adequate performance of administrative functions. From the viewpoint of the state, it is equally important to assess the cost of this performance.

Consequently, in this case, we would certainly supplement the measuring system with indicators of service quality and economic efficiency (see, e.g., Sepp 2008; Sepp and Noorkõiv 2008b). As the functions arising from legislation are generally mandatory for LG units – and, in principle, the same applies to justified demands of the residents – but administrative capacity is characterised by proper performance of all functions, assessment should be organised as comprehensively as possible. An additional challenge for this method is to take into account the changes in mandatory functions and in justified demands of the residents over time. Therefore, the method should be open to regular review of the criteria of administrative capacity (levels of minimum requirements).

2. TERRITORIAL DEVELOPMENT INDEX OF LOCAL GOVERNMENT UNIT

Kaja Sõstra, Statistics Estonia

Introduction

The comparison and ranking of the local government units using different indicators is a subject of great interest in Estonia. The latest example is the capacity index of local government units compiled by the Geomedia Consulting and Training Centre which experienced a large interest.

Composite indices are compiled also elsewhere. For example Finnish viability index (Sõstra 2004) and Latvian territorial development index. The composite indices are compiled internationally for comparison of the level of development of countries. The most famous of them is human development index.

The methodology of constructing composite indices is implemented in the present article for developing territorial development index. The index is based on the Latvian territorial development index and a handbook compiled by OECD.

Steps for constructing composite index

OECD has compiled a handbook about the methodology of constructing of composite indices (Handbook... 2008). The handbook presents the process of constructing of index as ten steps:

- 1) theoretical framework – the basis for combination of single indicators into a meaningful composite indicator under a fitness-for-purpose principle;
- 2) selecting variables – indicators should be selected on the basis of their reliability, measurability, coverage, relevance and relationship to each other;
- 3) imputation of missing data – for getting complete dataset if the values of selected indicators are missing for some unit or time point;
- 4) multivariate analysis – investigation of the overall structure of the indicators, assess the suitability of the dataset and explain the methodological choices;
- 5) normalisation of data – transforming the values of indicators for comparability;
- 6) weighting and aggregation – indicators should be aggregated according to the underlying theoretical framework and the correlation of indicators;
- 7) robustness and sensitivity – assessing the robustness of the composite index according to methodological choices made on previous steps;
- 8) back to the details – analysis of the forming of composite index, including the proportion of single indicators in the index;
- 9) links to other variables – comparison of the index with similar indices and variables;
- 10) presentation and dissemination – choice of the visualisation of the index.

The territorial development index of local government units is compiled and analysed according to these steps in the present article.

1st step. Theoretical framework

Theoretical framework compiled by experts is the starting point in constructing composite indicators. The framework should clearly bring out the goal of the work, define the multidimensional phenomenon to be measured and construct the selecting criteria for the indicators.

In the present article the theory is based on the Latvian territorial development index. Since the year 2000 a specific territory development index is being used in Latvia for comparative analysis of development level of local government units (Spāde et al 2009). Methodology for calculation of this synthetic index has initially been developed by Latvian Statistical Institute and approved by the Ministry of Economics for use of identification of “specially supportable areas” that would receive support for business development. This index is calculated by weighed summation of standardized values of basic statistical development indicators pertaining to local government units.

Standardized indicators are calculated on the basis of initial indicators, which describe the territory from different aspects and they are expressed in persons, funds, percentages or other actual units.

2nd step. Selecting variables

To select the indicators the following steps are necessary: to check the quality of the indicators; to discuss the strengths and weaknesses of each selected indicator; to create a summary table on data characteristics, e.g., availability, source and type.

The basis of selection of variables is Latvian territorial development index which uses four indicators for assessing the development of local government units:

- 1) population change – characterises the attractiveness of given territory to people, namely whether people want to live in given local government unit;

- 2) dependency ratio – characterises the potential of labour force and its regeneration capacity in given local government unit (demographic burden characterises the ratio of children and retired people to working age population);
- 3) personal income tax per inhabitant – characterises population income, which is indirectly associated to welfare. This indicator is of particular importance for local government units, as personal income tax forms the majority of revenues of local governments;
- 4) proportion of registered unemployed persons – characterises the economic activity in the local government unit.

The source for data is Statistics Estonia and the Population Register. Indicators are selected using the principle of comparability between local government units despite the size of the municipality. All indicators are calculated as a ratio of population of local government unit.

The data of the year 2008 are used, population is as of 1st January 2008 if it is not presented otherwise in the calculation formula.

$$\text{Population change} = \frac{\text{population 01.01.2008} - \text{population 01.01.2003}}{\text{population 01.01.2003}} \times 100 \%$$

$$\text{Dependency ratio} = \frac{\text{population aged 0-14} + \text{population aged 65+}}{\text{population aged 15-64}} \times 100 \%$$

$$\text{PIT per inhabitant} = \frac{\text{annual PIT received into local budget (thousand kroons)}}{\text{mean annual population by Population Register}}$$

$$\begin{aligned} \text{Proportion of registered} \\ \text{unemployed persons} \end{aligned} = \frac{\text{average number of unemployed persons per month}}{\text{population aged 16 to pension age}} \times 100 \%$$

3rd step. Imputation of missing data

The suitable imputation method should be chosen, first the missing values should be estimated. It's important to provide a measure of the reliability of each imputed value, so as to assess the impact of the imputation on the composite indicator results.

In the present article the indicators are selected in the manner that all indicators are available for all local government units, thus there is no need to impute the data.

4th step. Multivariate analysis

The purpose of the multivariate analysis is to study the overall structure of the dataset: relations between individual indicators and objects under observation – local government units. As a result of the analysis the groups of indicators or groups of units that are statistically "similar" will be identified and an interpretation of the results will be provided.

Correlation of indicators

To analyse the relationship between the indicators the correlation coefficient is appropriate to use, it shows the strength and the direction of the relationship. The values of the correlation coefficients are represented as correlation matrix (Table 2.1). The correlation coefficient is called medium strength if the absolute value is between 0.4–0.7. The correlation coefficient between the personal income tax per inhabitant and the other three indicators are medium strength. Correlation with population change is positive, this means that in the local government units with big and positive population change the personal income tax per inhabitant is also big (Figure 2.1). Correlations between the personal income tax per inhabitant and the dependency ratio and the proportion of registered unemployed persons are negative: the big personal income tax per inhabitant indicates to the small dependency ratio and the small proportion of registered unemployed persons (Figure 2.2).

Cluster analysis

Cluster analysis is the assignment of a set of objects or indicators into subsets (called clusters) so that objects or indicators in the same cluster are similar in some sense. The goal to group objects is to find similar (similar answers or similar behaviours) respondents or other objects under observation and divide them into groups (clusters). Data clustering algorithms can be hierarchical or k-means clustering.

In the present article the hierarchical clustering is used and besides four indicators for clustering the indicator – city or rural municipality – is also used. The hierarchical clustering is

suitable if there is relatively small number of objects to analyse. This analysis begins with each element as a separate cluster and merges them into successively larger clusters. The hierarchical clustering method uses the similarities between objects when forming the clusters (Niglas 2005). For example, two objects with exactly the same value form a cluster in the first step. The next step is to compare the objects and clusters and aggregate the most similar objects and clusters, etc. At the beginning of the hierarchical clustering each object is a cluster and finally, in the last step, all objects are joined together.

The decision point is how many clusters are optimal. Having compared the clusters in different steps it has been decided to make five clusters.

The clusters are ranked by the personal income tax per inhabitant in descending order. The descriptions of clusters are presented in Table 2.2 (see also Map 14 in Annex 1).

The first cluster includes local government units which indicators are considerably better than the Estonian average: rural municipalities around Tallinn (Harku, Jõelähtme, Keila, Killi, Rae, Saku, Saue, Viimsi), three rural municipalities from elsewhere of Estonia (Sauga, Ülenurme and Ruhnu rural municipality) and the only city is Saue.

The second cluster includes local government units which indicators are slightly better than the Estonian average: other cities and rural municipalities of Harju county, rural municipalities of Rapla county, centres of other counties (excl. Kohtla-Järve, Jõgeva, Valga and Võru city) and rural municipalities around county centres. This cluster also includes Püssi, Põltsamaa, Kunda, Sindi, Elva and Tõrva cities.

The third cluster includes local government units which indicators are close to the Estonian average: mostly rural municipalities far from the county centres. More than two thirds of the rural municipalities of Ida-Viru, Jõgeva, Põlva, Saare and Viljandi counties are in the third cluster. There are no cities in this cluster.

The fourth cluster includes local government units which indicators are worse than the Estonian average. The proportion of registered unemployed persons is especially large in Kiviõli, Kohtla-Järve, Narva, Narva-Jõesuu, Sillamäe, Jõgeva, Mustvee, Kallaste, Valga and Võru cities and rural municipalities of Põlva and Võru counties and in a few rural municipalities of other counties located far from the county centres.

The fifth cluster includes local government units which indicators are worse than the Estonian average, the personal income tax per inhabitant is very small and the dependency ratio is significantly higher than the average: rural municipalities located near the border of Estonia or monofunctional rural municipalities. The cluster includes Mõisaküla and Võhma cities, rural municipalities of Tudulinna (Ida-Viru county), Mikitamäe, Orava (Põlva county), Tootsi, Varbla (Pärnu county), Torgu (Saare county), Alatskivi, Peipsiääre, Piirissaare (Tartu county) and Meremäe (Võru county) rural municipality.

5th step. Normalisation of data

Before calculating the composite index the indicators should be comparable or normalized. There are different methods to normalize the data. In the present article two methods are under observation: standardizing and min-max method.

Standardizing

Standardizing is transforming the scale of indicator in a way that the mean would be 0 and standard deviation 1.0. Standardized value t_{ij} of local government unit i and indicator j is calculated as follows:

(...)

The indicators, which lower values are positive as concerns the development of local government units the (proportion of registered unemployed persons and dependency ratio), will be made comparable by changing the sign of standardized value.

Min-max method

Min-Max method transforms the indicator values to the interval 0–1. The local government unit with the maximum value of indicator gets the value 1 and the local government unit with the minimum value of indicator gets the value 0 and the values of other local government units are calculated as follows:

(...)

Normalizing methods used are preferable, because they keep relations between normalized values and actual values of the indicator.

Standardization has a great influence on the extreme values in the composite index, which is not always the purpose of the compiling composite index. Extreme values of the indicator can influence the result of the min-max method as well. For example in population change, which has a few high positive values, after the normalisation only six values are bigger than 0.5. On the other hand min-max method has a bigger influence on the indicator with small dispersion compared to the standardization.

6th step. Weighting and aggregation

In this step the appropriate weighting and aggregation procedures that suit both the theoretical framework and the data properties are selected. Weights can have a significant effect on the results of the composite index. To find weights several statistical methods or expert estimations can be used.

Most composite indicators rely on equal weighting, i.e. all indicators are given the same weight. This is the first choice also in the present article. Besides equal weights the Latvian territorial development index weights and weights based on factor analysis are used for the comparison (Table 2.4). Factor analysis takes into account the correlations between the indicators and gives a bigger weight to the indicator which is weakly correlated with the other indicators. As a result of the factor analysis the registered unemployment got the biggest weight. The registered unemployment is correlated only with the personal income tax per inhabitant with medium strength correlation. The other three indicators got relatively similar weights based on the results of the factor analysis. In the Latvian territorial development index the economic indicators are more important than population indicators: the registered unemployment and the personal income tax have bigger weights.

To aggregate indicators linear aggregation is used; the composite index I_i of the local government unit i is calculated as follows:

(...)

7th step. Robustness and sensitivity

Several judgements have to be made when constructing composite indicators, e.g. on the selection of indicators, data normalisation, weights and aggregation methods, etc. During the present analysis the influence of the different choices to the final result will be found out.

To compile the composite index two normalisation methods were used:

- 1) standardization,
 - 2) min-max method
- and three different set of weights:
- 1) equal weights,
 - 2) weights of the Latvian territorial development index,
 - 3) weights based on factor analysis.

Thus, six different composite indices were calculated for each local government unit. To compare the influence of the different methods to the composite index the local government units ranked by each composite index and the variability of the ranks were compared.

Ranks of local government units are the most stable at the beginning and the end of the ranking table. Three last local government units are the same irrespective of the calculation method. Among the top ten the ranks differ mostly by one only.

The variability was bigger in the middle of the ranking table, where the difference was over 20 ranks for 24 local government units (Figure 2.4). Half of these local government units got the minimum rank (the best rank) if the standardization and equal weights are used. Six local government units obtain the best rank using min-max normalisation and weights based on factor analysis. The same combinations of methods give also the maximum or the worst rank for local government units. The largest variability has Vormsi rural municipality, which has rank 159 if the standardization and equal weights are used and rank 212 if min-max normalisation method and weights based on the factor analysis are used (the difference 53 ranks).

The highest and lowest ranks of the units with higher variability of the six values of index are presented on Figure 2.4. Also the rank based on the index calculated by min-max normalisation method and equal weighting is presented.

Stability analysis shows that the composite index which is calculated with min-max method using normalized indicators and equal weights gives relatively less minimum or maximum

ranks for local government units compared to other methods. Thus, it's reasonable to use this method and those weights to calculate the composite index for ranking local government units.

8th step. Back to the details

The forming of the composite index and the impact of the variables to the value of the index are examined.

Two local government units have the largest value of the index: Kiili and Viimsi rural municipality (0.874). The impact of the population change is higher for Kiili rural municipality and personal income tax for Viimsi rural municipality. Harku rural municipality has the third rank with the value of the index 0.826. The values of the index of three first local government units differ clearly from the results of other local government units. A small proportion of the registered unemployed persons and a large personal income tax have greater impact among the first 20 local government units (Figure 2.5). Ruhnu and Sauga rural municipality are different (relatively larger impact of the population change) and Vasalemma rural municipality also differs (larger impact of the low dependency ratio).

There are extremely low indicators of population change and personal income tax among the last 20 local government units (Figure 2.6).

9th step. Links to other variables

The derived composite index is compared with other similar indices or variables. Correlation or regression analysis can be used for this purpose.

Firstly the values of the index were compared with the results of cluster analysis of the fourth step (Figure 2.7). The values of composite index are well related to the results of cluster analysis. There are some overlaps between clusters but the first cluster is clearly differed, also the values of index of the second cluster overlap only partly with the values of the third cluster. The values of the index of the fifth cluster overlap completely with the values of the fourth cluster but are below all other three clusters.

Geomedia Consulting and Training Centre developed the local government capacity index (Sepp, Noorkõiv and Loodla 2009). Comparison the values of the local government capacity index and territorial development index shows that these indices are well in consistency. The correlation coefficient of the indices is 0.73 which shows strong relations between indices.

The same can be seen on Figure 2.8.

10th step. Presentation and dissemination

The results of the composite index have to be presented clearly and accurately using visualisation method which communicates information in the best way. The initial variables used for compiling composite index, the value of the index (computed using min-max normalisation method and equal weights) and the rank of the local government unit are presented in Table 2.5 (see also Maps 9–13 in Annex 1).

Summary

The steps for compiling composite index from theoretical framework, selecting the data to presentation results have been observed in the present article. The local government units are compared based on the selected data more thoroughly using cluster analysis. Also the sensitivity analysis of the choices of different normalisation and weighting methods to the results of the composite index is carried out.

The analysis of the different options for compiling the territorial development index of local government units shows that for selected four variables the most suitable methods are min-max normalisation and aggregation with equal weights.

The rural municipalities located around Tallinn: Kiili, Viimsi and Harku rural municipalities have the highest values of the index. There are 18 rural municipalities and cities of the Harju county among the first 25 local government units. The results of the developed index are in consistency with the local government capacity index.